Vol. 20. Parts 7–8. Pp. 73–96, 23 figs. 15th August, 1951

THE PROCEEDINGS

OF THE

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Series B

TAXONOMY

(being the continuation of Stylops)

World List abbreviation: *Proc. R. ent. Soc. Lond.* (B)

CONTENTS

PAGE

DIRSH, V. M., D.Sc., F.R.E.S. Some New and Little Known African ACRIDIDAE (Orthoptera) . . . . . 73–79, 17 figs.

CHOW, C. Y., and MATTINGLY, P. F. The Male Genitalia and Early Stages of *Aëdes* (*Finlaya*) *albocinctus* Barraud and *Aëdes* (*Finlaya*) *albotaeniatus* var. *mikiranus* Edwards with some notes on related species . . . . . 80–90, 6 figs.

JACKSON, T. H. E., F.R.E.S. Notes on Some New or Rare Rhopalocera from Eastern Africa. Part I 91–96

LONDON

PUBLISHED BY THE SOCIETY AND

SOLD AT ITS ROOMS, 41, QUEEN'S GATE, S.W.7

Price 8s. 0d.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Founded 1833. Incorporated by Royal Charter 1885.

Patron—HIS MAJESTY THE KING.

OFFICERS AND COUNCIL FOR THE SESSION, 1951-1952.

N. D. RILEY, F.Z.S. *President.*

B. P. UVAROV, C.M.G., D.Sc., F.R.S.
PROF. G. C. VARLEY, M.A., PH.D.
V. B. WIGGLESWORTH, M.A., B.Ch., M.D., F.R.S.
} *Vice-Presidents.*

A. WELTI, *Treasurer.*

E. B. BRITTON, M.Sc., *Secretary.*

H. OLDROYD, M.A., *Editor.*

Other Members of Council.

C. L. COLLENETTE, F.R.G.S.
C. T. GIMINGHAM, O.B.E., F.R.I.C.
N. E. HICKIN, PH.D.
C. W. MACKWORTH-PRAED.
LT.-COL. W. B. L. MANLEY.
G. D. MORISON, B.Sc., PH.D.
L. PARMENTER.
C. POTTER, Ph.D., D.Sc.
A. ROEBUCK.
T. H. C. TAYLOR, D.Sc.

MISS E. EVANS, *Registrar.*

Finance and House Committee.

N. E. HICKIN, PH.D. (Chairman).

R. L. E. FORD.
LT.-COL. W. B. L. MANLEY.
C. POTTER, Ph.D., D.Sc.
F. VAN EMDEN, PH.D.
A. J. A. WOODCOCK, M.Sc.

Publication and Library Committee.

PROF. G. C. VARLEY, M.A., PH.D. (Chairman).

W. E. CHINA, M.A., Sc.D.
MISS T. CLAY.
J. W. EVANS, M.A., D.Sc.
G. T. GIMINGHAM, O.B.E., F.R.I.C.
D. L. GUNN, D.Sc., PH.D.

Nomenclature Committee.

FRANCIS HEMMING, C.M.G., C.B.E. (Chairman).

W. A. F. BALFOUR-BROWNE, F.R.S.E.
K. G. BLAIR, D.Sc.
O. W. RICHARDS, M.A., D.Sc.
N. D. RILEY (Secretary).

Committee for the Protection of British Insects.

H. M. EDELSTEN, O.B.E. (Chairman).

R. B. BENSON, M.A., Mem. Hon. Soc. ent. Belg.
C. A. W. DUFFIELD, M.C., J.P.
B. M. HOBBY, M.A., D.PHIL.
CAPT. R. A. JACKSON, C.B.E., R.N.
LT.-COL. W. B. L. MANLEY.
A. M. MASSEE, D.Sc.
A. ROEBUCK.
THE HON. MIRIAM ROTHSCHILD.
N. D. RILEY (Secretary).

The Executive Officers of the Society are *ex-officio* members of all Committees.

DELEGATES OF THE SOCIETY TO :

1. **British National Committee for Biology** (Royal Society).
   Francis Hemming, C.M.G., C.B.E., appointed 1946.
   E. B. Ford, M.A., D.Sc., F.R.S., appointed 1949.
2. **Local Committee of Management of Wicken Fen.**
   H. M. Edelsten, O.B.E. (nominated by Committee for the Protection of British Insects).
3. **National Trust for Places of Historic Interest or Natural Beauty.**
   H. M. Edelsten, O.B.E., appointed 1944.
4. **New Forest Association.**
   C. W. Mackworth-Praed, appointed 1948.
5. **New Forest Joint Committee.**
   Lt.-Col. F. C. Fraser, appointed 1949.
6. **Royal Meteorological Society. Phenological Committee.**
   C. B. Williams, M.A., D.Sc., appointed 1937.
7. **Council for the Promotion of Field Studies.**
   W. H. Thorpe. M.A., Sc.D., appointed 1944.
8. **Joint Bioclimatic Committee.**
   B. P. Uvarov, C.M.G., D.Sc., appointed 1945
   C. B. Williams, M.A., D.Sc., appointed 1945
9. **Yorkshire Naturalists' Trust, Ltd.**
   W. D. Hincks, M.P.S., appointed 1946.

SOME NEW AND LITTLE KNOWN AFRICAN ACRIDIDAE (ORTHOPTERA).

By V. M. Dirsh, D.Sc., F.R.E.S.

Burttia gen. n.

Of medium size, slender.

Antenna longer than head and pronotum together, filiform, in the basal part weakly flattened; its segments, in the middle part, about twice as long as broad, all sharply separated. Fastigium of vertex acutely triangular, with the apex strongly projecting; above with elongated concavity, limited by the low, obtuse lateral carinulae and divided by the median longitudinal carinula. Occipital carinula very sharp. Face sinuate in profile. Frontal ridge, in profile, in the upper part rounded and strongly produced in front of the eyes, narrow, with a deep sulcus opposite the base of antenna; below the ocellus, with a shallow sulcus, obliterate in the lowest half. Facial carinulae in the upper half sharp, in the lower one weak.

Pronotum above almost flat, with weak callous thickenings instead of lateral carinae; median carina very distinct; 3 transverse sulci; first one weak, second more developed, and the third crosses the median carina. Metazona 5 times shorter than prozona, its posterior margin broadly incurved. Prosternal tubercle acute-conical, with broadened base. Mesosternal interspace large, broader than long, scarcely narrowed forwards. Metasternal interspace, in male, narrow, inverse triangular; in female, large, broader than long.

Elytra and wings absent. Mesonotum, metanotum and abdomen with a longitudinal carina.

Hind femur slender. Hind knee with short, rounded lateral lobes. Tibia long. Arolium large and broad, as long as a claw.

Supra-anal plate of male elongate triangular, with two rounded lateral projections in the basal part; in female, elongated triangular without projections. Male cercus conical, slightly curved; female cercus conical, straight. Subgenital plate, in male, curved upward, subconical, with obtuse apex; in female, with broadly triangular apex. Ovipositor valves long and slender, weakly curved at the apices.

Genotype: *Burttia sylvatica* sp. n.

This Catantopine genus is not closely related to any known one. The structure of the face, with strongly projecting frontal ridge in the upper part, which forms the characteristic incurved profile, the elongate and sharply separated antennal segments and the absence of elytra and wings approximate the new genus to the group to which belong *Gemeneta* Karsch, 1882, and *Mazaea* Stål, 1876. From both these genera *Burttia* differs by less incurved facial profile, by the fastigium of vertex and by the general shape of head, which is relatively more robust.

This genus is named after Dr. E. Burtt, who collected it, together with a vast number of other Acrididae.

Burttia sylvatica sp. n. (figs. 1–3).

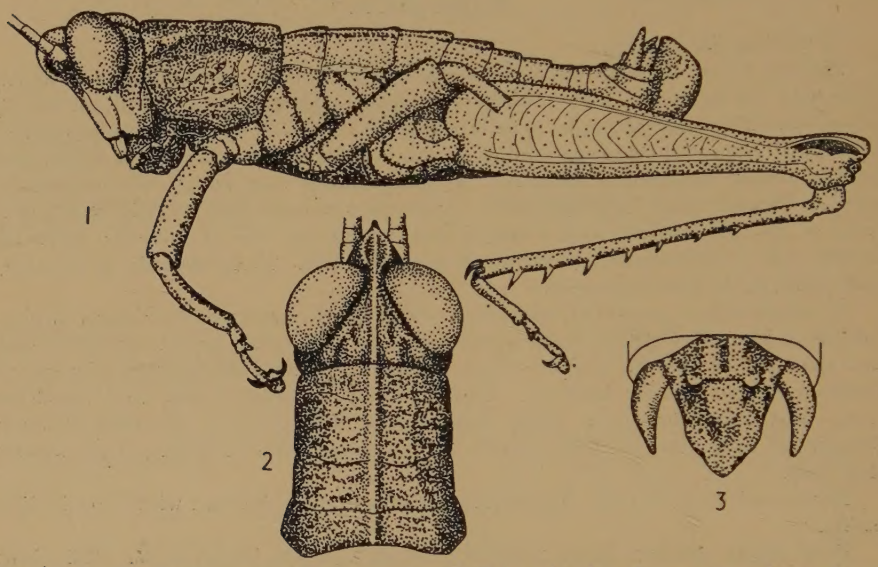
♂ (type). Body finely rugulose and punctured. General coloration brownish; lower part of face yellow; anterior and median legs yellowish; posterior femur, in the basal part, brownish yellow, gradually becoming darker to the apex; hind knee dark; hind tibia bluish-grey.

♀ (paratype). As the male but larger. General coloration as in the male, but lateral lobes of pronotum and partly the pleurae dark, almost black, lustrous; the lateral sides

of abdomen with a broad, black longitudinal stripe. Base of the hind femur, on the upper side, sometimes bright yellow.

Length of body, ♂ 14, ♀ 20·5; pronotum, ♂ 3, ♀ 4·5; hind femur, ♂ 9, ♀ 12 mm.

TANGANYIKA TERRITORY: Morogoro, rain forest, 5000 ft., 8.x.1939, 1 ♂ (type), 1 ♀. xi.1939, 1 ♂, 1 ♀, 1 nymph (*E. Burtt*).



FIGS. 1–3.—(1) *Burttia sylvatica* sp. n., ♂. (2) Ditto, head and pronotum from above. (3) Ditto, supra-anal plate.

Physocrobylus gen. n.

Body of medium size, robust and inflated in the middle; ratio of length to maximal width 2·8.

Antenna one-third longer than head and pronotum together, filiform, scarcely flattened in the basal part. Fastigium of vertex small, with a shallow concavity; interocular space as broad as the 1st antennal segment; occiput with a low carinula. Frontal ridge, in profile, projects strongly in front of the eyes, between antennae; shallow concave and strongly punctured; below the ocellus flat and almost obliterated, with weakly marked lateral margins. Facial carinae sharp.

Pronotum broadened backwards, round in transverse section; median carina slightly marked in prozona only; lateral carinae absent; 3 fine transverse sulci; metazona half the length of the prozona, its posterior margin weakly incurved in the middle. Prosternal tubercle, viewed from the front, broad, with broadly rounded apex; in profile, broadly conical. Mesosternal interspace large, broader than long. Metasternal interspace large, widened forwards.

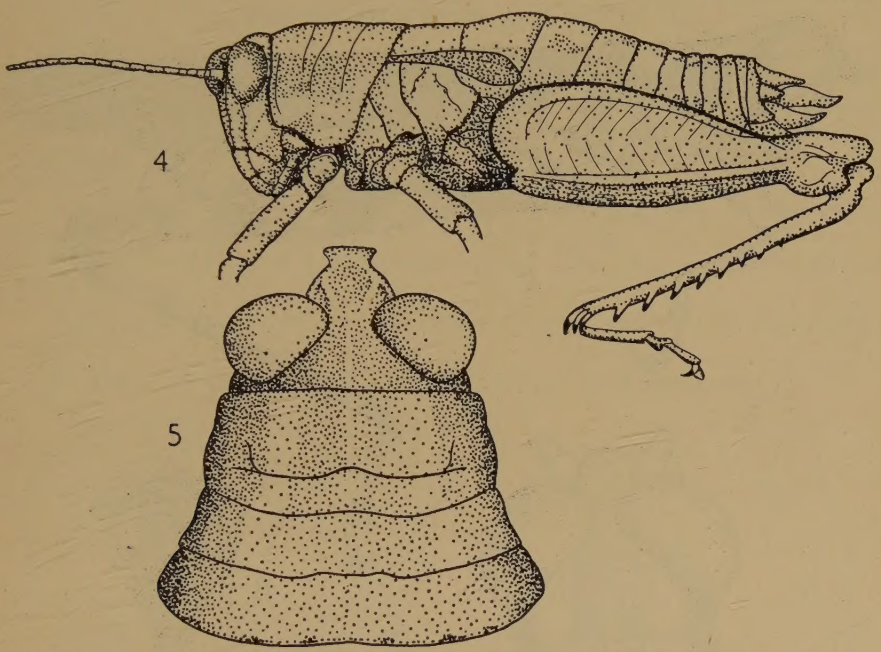
Elytra rudimentary, lobiform, narrow at the base and slightly broadened to the apex; reaching to the 2nd abdominal tergite, and covering the tympanal organ.

Hind femur broad and thick; ratio of length to width 2·6. Lobes of the hind knee short; upper lobe rounded, lower one obtusangulate. Hind tibia considerably shorter than the femur; its lower side with a deep longitudinal sulcus. Arolium large and broad, almost ¾ the length of claw.

Supra-anal plate narrow-triangular. Cercus short, conical. Subgenital plate with the apex broadly rounded. Ovipositor short, with narrow, weakly curved valves.

Genotype : *Physocrobylus burtti* sp. n.

This genus approaches the genera *Stenocrobylus* Gerst. and *Crobylostenus* Ramme, by the shape of fastigium of vertex, broad hind femur, short hind tibia and broad prosternal tubercle. But it differs from both of them in the inflated, broad body, rudimentary elytra and strongly projecting upper part of the frontal ridge.



Figs. 4, 5.—(4) *Physocrobylus burtti* sp. n., ♀. (5) Ditto, head and pronotum from above.

Physocrobylus burtti sp. n. (figs. 4, 5).

♀ (type). Body densely and finely punctured. General coloration brown, with indistinct yellowish spots, forming an indistinct yellowish lateral stripe along the body. Hind tibia above dirty white ; the spines with dark apices.

Length of body 21·6 ; pronotum 5 ; elytron 4·5 ; hind femur 7·2 mm.

Tanganyika Territory : Kibariani, Mpwapwa, riverine forest, 4500 ft., 20.ix.1947, 1 ♀ (type) (*E. Burtt*).

Exopropacris gen. n.

Of medium size, slender.

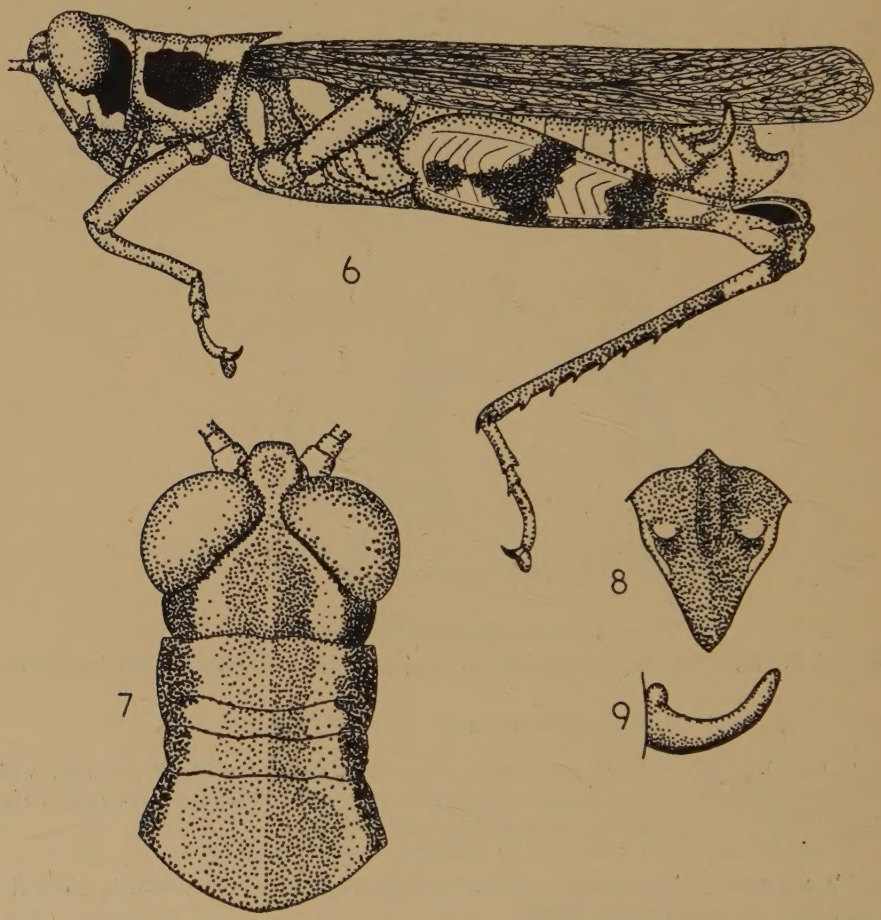
Antenna rather longer than head and pronotum together, almost filiform, scarcely flattened. Fastigium of vertex small, narrowed to the apex ; interocular space narrower than the first antennal segment. Frons, in profile, strongly oblique, straight. Frontal ridge above the ocellus flat and punctured, below it concave, with parallel, distinct margins ; facial carinae sharp.

Pronotum subcylindrical, in the middle slightly constricted ; median carina indistinct ; lateral carinae absent ; 3 distinct transverse sulci ; metazona scarcely shorter than prozona, its posterior margin broadly rounded. Prosternal tubercle cylindrical, with

rounded apex and slightly broadened base ; inclined backwards. Mesosternal interspace as long as broad, with incurved margins.

Elytron produced slightly beyond the apex of the abdomen, with dense reticulation and rounded apex. Wing well developed, almost as long as elytron.

Hind femur slender, ratio of length to width 3·8. Lateral lobes of the hind knee short and rounded. Hind tibia almost as long as the femur. Arolium large, broad, slightly longer than claw.



Figs. 6–9.—(6) *Exopropacris sudanica* sp. n., ♂. (7) Ditto, head and pronotum from above. (8) Ditto, supra-anal plate. (9) Cercus.

Supra-anal plate narrowly triangular, with two small, sharp projections in the middle (fig. 8). Subgenital plate subconical, in profile, with subacute apex. Cercus strongly curved upwards.

Genotype : *Exopropacris sudanica* sp. n.

This genus is related to *Pirithoicus* Uvarov, 1940, and *Catantops* Schaum, 1853. It differs from *Pirithoicus* by the structure of the hind femur, which in *Pirithoicus* is thick, with almost obliterated upper median carina, but in *Exopropacris* is of normal shape with a distinct upper median carina ;

by the broader interocular space ; by the mesosternal interspace, the margins of which are incurved in the *Exopropacris*, but are straight in the *Pirithoicus*, in which the interspace is almost square. From *Catantops* (as compared with the genotype) the new genus differs by narrower interocular space ; less constricted mesosternal interspace ; slightly constricted pronotum ; more slender body and general habitus.

Exopropacris sudanica sp. n. (figs. 6–9).

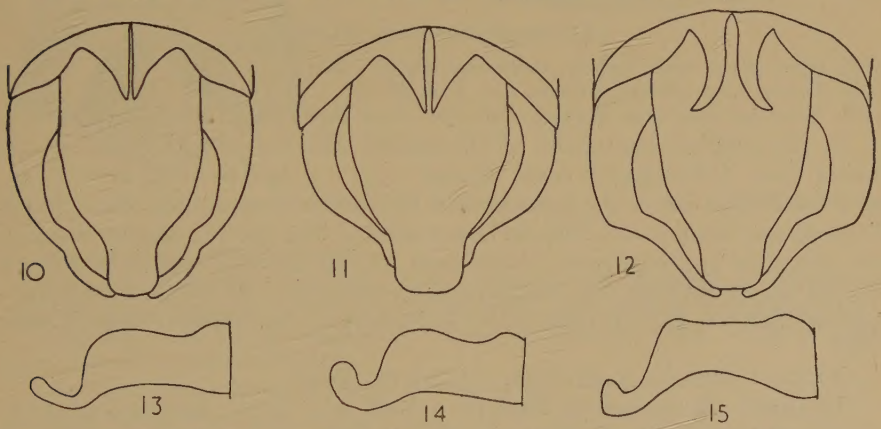
♂ (type). General coloration brownish olivaceous. Head with yellow cheeks ; behind the eyes broad blackish-brown stripe ; lateral lobe of pronotum yellow with broad blackish stripe, which does not reach the anterior margin. Anterior and middle legs dirty yellow. Posterior femur yellow, with 2 blackish, broad, irregular fasciae on both sides and with dark knee ; hind tibia brownish with yellow basal ring ; hind tarsus yellowish. Elytron uniformly brownish ; wing golden yellow, slightly infumate to the apex.

♀ (paratype). As the male, but larger. Subgenital plate with broadly triangular apex. Ovipositor small, slender, with weakly curved valves.

Length of body, ♂ 22·3, ♀ 30 ; pronotum, ♂ 4·6, ♀ 6·5 ; elytron, ♂ 17, ♀ 20·5 ; hind femur, ♂ 11·8, ♀ 17 mm.

Anglo-Egyptian Sudan : Lotti, 04·02°N.,32·32°E x.1949, 2 ♂ (including type).

E. Belgian Congo : ix–x.1946, 1 ♂, 1 ♀ (*T. H. E. Jackson*).



Figs. 10–15.—(10) *Cyphocerastis laeta* Karsch, ♂, apex of abdomen. (13) Ditto, cercus. (11) *Cyphocerastis tristis* Karsch, ♂, apex of abdomen. (14) Ditto, cercus. (12) *Cyphocerastis falcifera* (Rehn), ♂, apex of abdomen. (15) Ditto, cercus.

Cyphocerastis Karsch (figs. 10–15).

1891, *Cyphocerastis* Karsch, *Berl. ent. Z.* **36** : 181.
1902, *Cyphocerastes* I. Bolivar, *Ann. Soc. ent. Fr.* **70** : 625.
1914, *Kivuia* Rehn, *Dtsch. Centr. Afr. Exped.* **5** : 119 (syn. n.).

In the original description of the genus *Kivuia*, Rehn referred : " Verwandt mit *Cyphocerastis* Karsch, von dieser aber verschieden durch die Reduction der Tegmina und Flügel und durch die eigentümliche Gestalt der furcula."

I have been able to study paratypes of *Cyphocerastis laeta* Karsch (genotype of *Cyphocerastis*), and *Cyphocerastis tristis* Karsch. In both species there is a furcula as in *Kivuia falcifera* Rehn (the genotype of *Kivuia* Rehn). As a difference between these two genera there remain only more or less shortened

elytra and wings in *Kivuia*, but this cannot be regarded as a generic character. Therefore I regard *Kivuia* Rehn, 1914, as a synonym of *Cyphocerastis* Karsch, 1891.

The best generic characters of *Cyphocerastis* are the shape of the male cercus, which is broadened in the basal three-fourths and strongly curved and narrowed in the apical fourth with the apex more or less broadened again; the presence of a furcula, which represents the strongly elongated lobes of the last tergite (figs. 10–12); and the shape of the pronotum, with acutangular posterior margin and a distinct median carina.

Cyphocerastis pulcherrima Ramme, 1929, described on a single female in the British Museum, probably belongs to another genus, since the shape of pronotum is not as in *Cyphocerastis*, but it is impossible without a male to determine to which genus it belongs.

Cyphocerastis falcifera (Rehn).

1914, *Kivuia falcifera* Rehn, *Dtsch. Centr. Afr. Exped.* **5** : 182.

Uganda: Sezibwa Falls, 16.iv.1933, 1 ♂ (*H. B. Johnston*). Mabira Forest, Chagwe, 17–20.vii.1911, 2 ♂, 1 ♀ (*C. C. Gowdey*).

Belgian Congo: La Chuta Forest, Rutshuru, 9.viii.1949, 2 ♂ (*E. Burtt*). Bambesa, Prov. Orientale, vii.1934, 1 ♂ (*H. J. Bredo*).

Paracoptacra cauta Karsh.

1896, *Paracoptacra cauta* Karsch, *Stettin. ent. Ztg.* **57** : 304.
1923, *Paracoptacra birunga* Sjöstedt, *Ark. Zool.* **15** : 30.
1929, *Paracoptacra sjöstedti* Ramme, *Mitt. Zool. Mus. Berlin* **15**, 2 : 344, f. 56 (**syn. n.**).

In the original description of *P. sjöstedti* Ramme says that this species differs from *Paracoptacra cauta* Karsch only by the pattern, not by any structural characters. An examination of a series of specimens from Kenya, Tanganyika, Ruanda and Belgian Congo showed that the two supposed species are connected by transitional colour forms, and the extreme coloration patterns are not connected with the geographical distribution. Therefore *Paracoptacra sjöstedti* Ramme, 1929, is regarded as a synonym of *Paracoptacra cauta* Karsch, 1896.

Kenya: Kericho, 4.xii.1945, 1 ♂, 2 ♀ (*E. Burtt*).

Uganda: Ruwenzori, 6–7000 ft., i.1935, 2 ♂, 4 ♀. Kigezi, 7–8000 ft., x.1934, 3 ♂, 3 ♀ (*D. R. Buxton*). Kigezi Dist., Mabungo Camp, 6000 ft., xi.1934, 4 ♂ (*J. Ford*). Entebbe, viii.1911, 1 ♀ (*C. C. Gowdey*). Sezebwa Falls, iv.1933, 1 ♀. Gayaza, x.1933, 1 ♀ (*H. B. Johnston*).

Ruanda: Kisanye, viii.1949, 3 ♂, 3 ♀ (*E. Burtt*).

Belgian Congo: Rutshuru, viii.1949, 5 ♂, 5 ♀ (*E. Burtt*).

Eleutherotheca burtti sp. n. (figs. 16, 17).

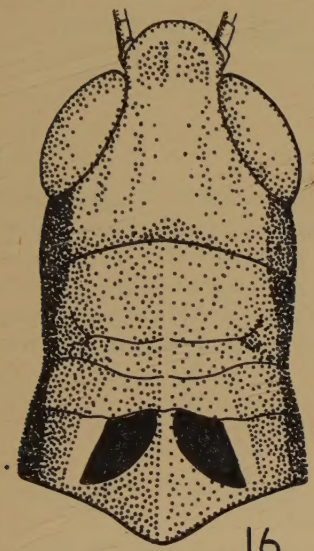
♂ (type). Body very robust; ratio of length to maximal width 3·3.

Antenna two-thirds the length of head and pronotum together, filiform, with short segments. Fastigium of vertex short and broad with a shallow concavity, which is divided by a low indistinct median carinula; apex rounded; foveolae of vertex flat and slightly punctured (practically absent). Frontal ridge broad, flat and smooth, obliterated below the ocellus.

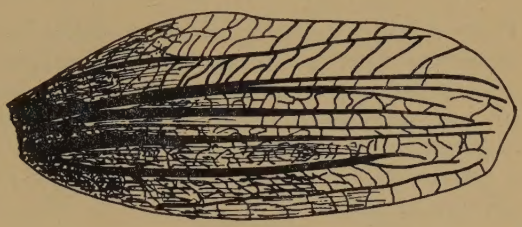
Pronotum subcylindrical, slightly widened backwards; median carina weak; lateral carinae indistinct X-shaped; three narrow distinct transverse sulci; only the posterior

one crossing the median carina. Metazona half the length of prozona, its posterior margin obtusangulate, with incurved sides and obtuse apex. Prosternum with a low and broad convexity. Mesosternal interspace short, broader than long, slightly narrowed forwards. Metasternal interspace elongated.

Elytron short, reaching the 6th abdominal tergite, with simplified and thickened venation; area mediastina and area scapularis strongly widened, transparent and lustrous with sparse transverse veinlets. Wing rudimentary, reaching to the apex of 2nd abdominal tergite, with thick and simplified venation.



16



17

FIGS. 16, 17.—(16) *Eleutherotheca burtti* sp. n., ♂, head and pronotum. (17) Ditto, elytron.

Tympanal organ large, rounded.

Hind femur robust, comparatively short; ratio of length to width 3. Stridulatory pegs very small and dense. Arolium large and broad, three-quarters the length of claw.

Supra-anal plate elongate-triangular. Cercus acute-conical, short. Subgenital plate short, subconical, with obtuse apex.

General coloration brownish; head behind the eyes with a dark broad stripe, which continues on the lateral lobe of pronotum; metazona of pronotum with 2 black spots of a regular form (fig. 16); base of elytron darkened; hind femur light brownish, with 2 indistinct fasciae on the upper and internal sides; hind tibia brownish.

♀ (paratype). As the male, but larger and more robust; ratio of length to maximal width 3–3·1.

Elytron reaching to the 4th abdominal tergite. Ovipositor short, robust, with broad, moderately curved valves. Subgenital plate with short triangular projection on the apex.

Length of body, ♂ 15·7–16·3, ♀ 20–23; pronotum, ♂ 4–4·4, ♀ 4·6–6·2; elytron, ♂ 5·4–6, ♀ 6–8·5; hind femur, ♂ 10·3–10·5, ♀ 11–15 mm.

TANGANYIKA TERRITORY: Mpwapwa and Mpwapwa-Kikombo, viii–xi.1949, 9 ♂ (including type), 28 ♀ (*E. Burtt*).

Varies in the shade of coloration. The black spots on the metazona of pronotum are often absent.

Strongly differs from all known species of the genus by large size, shortened elytra, and robust body.

THE MALE GENITALIA AND EARLY STAGES OF *AËDES* (*FINLAYA*) *ALBOCINCTUS* BARRAUD AND *AËDES* (*FINLAYA*) *ALBOTAENIATUS* VAR. *MIKIRANUS* EDWARDS WITH SOME NOTES ON RELATED SPECIES.

By C. Y. CHOW

(*Division of Medical Entomology, National Institute of Health of China, Taiwan*),

AND

P. F. MATTINGLY

(*British Museum* (*Natural History*)).

PART of the material on which the following descriptions were to have been based was destroyed in the course of military operations in Northern China after it had been examined in whole or in part by both authors. In view of the interest recently taken in this group and the inadequate nature of some earlier descriptions it has seemed desirable that one of us (P. F. M.) should prepare a detailed description of the remainder, which is now in the British Museum (Natural History).

Aëdes (*F.*) *albocinctus* Barraud.

Male Terminalia.

Material examined.—Type and 1 other ♂, Solon, 2 ♀, Koti, W. Himalayas; 1 ♂, Chefang, Yunnan, China, all in British Museum (N.H.).

As stated by Chow (1949), no adequate description of the male terminalia of this species exists. Barraud (1924, 1934) merely states that they "show no marked modifications." For the purposes of the present study a comparison was made with the terminalia of the type and one other topotypic male of *Aëdes* (*F.*) *gilli* Barraud, the only other species in Division III of group F of the sub-genus (Knight, 1948) of which the male is known.

Aëdes albocinctus (fig. 1*a*) has the style moderately long, rather slender and somewhat curved. Terminal appendage very long, almost $\frac{2}{3}$ the length of the style in the Solon and Yunnan specimens. In the specimens from Koti it is shorter, about $\frac{3}{10}$ to $\frac{1}{3}$ the length of the style, and in one of these specimens it is bifid at the tip on one side, though apparently simple on the other. There is no sub-apical scale tuft on the ventral border of the coxite, but the latter has a small sub-basal lobe bearing a single long, stout, colourless bristle, bent at the tip. The stem of the harpago is rather long and straight, its terminal appendage narrow and falciform. The crown of the paraproct has two heavily sclerotized teeth. The emargination of the IXth tergite is rather shallow and the lobes are well separated. Each bears 3–5 short bristles. *Aëdes gilli* (fig. 1*b*) differs in having the style almost straight and its terminal appendage shorter, just under $\frac{1}{3}$ the length of the style in the type and about $\frac{1}{4}$ in the other specimen examined. The basal lobe of the coxite is smaller and nearer the base and devoid of any conspicuously modified bristles.

Pupa.

Material examined.—4 pelts with associated ♀ adults and larval pelts, Koti, W. Himalayas, and 1 pelt with associated larval pelt, Chefang, Yunnan, China, all in British Museum (Natural History).

The pupa of this species has not previously been described. The specimens from Koti show the following characters. The nomenclature used is that of Knight and Chamberlain (1948).

FIG. 1.—Male terminalia.—a. *Aëdes* (*F.*) *albocinctus*. a′. Harpago; a″, crown of paraproct; a‴, IXth tergite. b. *Aëdes* (*F.*) *gilli*. b′, style; b″, basal lobe of coxite.

Cephalothorax (fig. 2*a*) with trumpets of moderate length, narrowly conical, rather more deeply infuscated on about the basal $\frac{2}{3}$, but not conspicuously so; meatus occupying about $\frac{7}{10}$ to $\frac{3}{4}$ of the whole. Seta 1 short, delicate, bifid or trifid, 2 long, delicate, single, 3 long, stout, plumose, with 7–9 branches, about 3 times as long as seta 1 or rather more, and from about $\frac{3}{4}$ the length of the paddle to equal in length with it; 4, 5 and 7 all long, stout and lightly plumose, 4 with 5–6 branches, 5 with 4, 7 with 6–8, 6 small, delicate, single to trifid, 8 and 9 long, stout, delicately plumose, 8 with 4–6 branches, 9 with 1–3, 10, 11 and 12 all short and rather delicate, 10 with 3–5 branches, 11 single, 12 with 2–4. *Abdomen* (fig. 2*b*): Segment I with seta 2 modified to form a well-developed float hair; setae 7 and 10 of moderate length, others inconspicuous. Seta 3 single, 4 single or bifid, 5 single to trifid, 6 with 2–5 branches, 7 single or double, 8 single, 10 double. On the remaining segments seta 1 forms a minute bristle, as usual. Segment II with all setae except 7 small and inconspicuous. 2 with 7–8 branches, 3 single, 4 single to trifid, 5 single or bifid, 6 with 4–5 branches, 7 single to trifid, 8 and 10 single. Segment III with seta 2 3 to 9-branched, 3 minute, single, 4 single, 5 single or bifid, 6 single to trifid, 7 single or bifid, 8 single, 9 trifid, 10 bifid, 11 and 12 single or bifid. Setae 2, 4 and 7 are rather long, the remainder

short. The usual hairless setal ring is present between 5 and 6. Its precise position is variable. Segment IV with setae 2, 5 and 7 long and fairly stout, the remainder short and inconspicuous. 5 from about ¾ the length of to equal in length with the paddle. Seta 2 with 5–7 branches, 3 single, 4 with 2–4 branches, 5 with 2–6, 6 and 7 single or bifid, 8 single, 9 bifid or trifid, 10 single to trifid, 11 single. Hairless setal ring situated between 5 and 6, its precise position variable. (The smaller setae on this and the following segments have been omitted from fig. 2 for the sake of clarity. Their position is very much as shown for *Aëdes niveus* by Knight and Chamberlain (1948)). Segment V much like segment IV, but seta 2 with 2–5 branches, 4 with 1–4, 6 with 2–4, 7 with 1–3, 9 and 10 with 2–4. The hairless setal ring may lie between 4 and 6 or 5 and 6. Segment VI much like V, but seta 5 with 3–4 branches, 7 with 2–5, 9 bifid, 10 single. Hairless ring absent as usual. Segment VII with the smaller setae much as on VI, but 2, 5 and 7 all very much shorter, 2 bifid or trifid, 5 single, 7 single to trifid, 8 much more strongly developed than on the anterior segments, with 2–5 stout, stiff, plumose branches, some or all of which may be split distally into two. Segment VIII with 5 single, 8 with 6–7 branches. *Paddle* rather long and narrow, the mid-rib narrow but well sclerotized and distinct, outer edge with a few very delicate denticles on about the distal half, but these do not reach as far as seta 8. The latter set on a small papilla and with 2–4 branches. The Yunnan pelt differs as follows: *Cephalothorax* with seta 3 9-branched on one side, 10-branched on the other, 4 with 7 branches on one side and 8 on the other, 5 with 3 branches on one side and 5 on the other, 9 and 12 missing on one side, 6-branched on the other. *Abdomen* with seta 4 5 to 6-branched on segment II. Segment III with setae 6 and 7 trifid on one side, 4-branched on the other, 10 bifid on one side, trifid on the other. Segment IV with seta 2 8-branched on one side, 9-branched on the other, 6 trifid on one side, 7 trifid on one side, 4-branched on the other, 11 bifid on one side. Segment V with seta 2 6-branched on one side, 7-branched on the other, seta 7 4-branched on both sides. Segment VI with seta 9 5-branched. Segment VII with seta 2 trifid on one side, 4-branched on the other, 5 single on one side, bifid on the other, Segment VIII with seta 5 bifid on one side, 8 with 9 branches on one side and 11 on the other.

For purposes of comparison 4 other pelts of species in Division III were examined. These included 3 pelts with associated larval pelts and adults of *Aëdes gilli* from the type locality, and a single pelt with associated larval pelt also from Krol Mountain and with the same date, numbered 2516 and labelled by Barraud "*Aëdes* (*F.*) *simlensis* ?." The pelts of *Aëdes gilli* differ from those of *albocinctus* as follows:

Cephalothorax (fig. 2*b'*) with trumpet unicolorous, very dark, meatus longer, about ⅘ the length of the whole or slightly more. Seta 3 much less strongly developed, only slightly stouter than seta 1 and not more than 1·5× as long. This seta with only 2–3 branches as compared to 2–5 in the case of seta 1. *Abdomen* with seta 5 of segment VI single and very long, about 1·2 to 1·5 × the length of the paddle, seta 7 small and inconspicuous on all segments. *Paddles* (fig. 2*b''*) much narrower at the base than at the apex and with seta 8 extremely long, about ½ as long again as the paddle. Paddle edge with a fringe of spines extending from about half way up the outer side to well beyond seta 8; these spines just visible with ⅔ in. objective and 10 × eyepiece. Minor differences are as follows: *Cephalothorax* with seta 2 2 to 5-branched, 4 with 3–5 branches, 5 with 3–6, 6 with 5–8, 7 with 3–4, 8 with 6–9, 9 with 1–2, 10 with 5–6, 11 with 1–2, 12 with 4–5. *Abdomen*: Segment I with seta 4 2 to 4-branched, 5 with about 5 branches, 6 with about 10, 7 single in all specimens seen. II with the smaller setae arranged somewhat differently, 4 lying well outside 5 and further forward, at about the same level as 7, 6 outside 4 and slightly further forward still, 2 with the branches strongly subdivided, rather as on segment I, 4 and 6 each with about 7 branches, 5 single to trifid, 7 single, 10 single or bifid. III with seta 4 single or bifid, 5 with about 7 branches and slightly anterior to 6, 6 with about 3–7

branches, 7 with 3–4, 9 with 7–8 branches and slightly posterior to 10, which has 3–5, 11 bifid, or trifid. IV with seta 2 4 to 10-branched, 4 with 5-6 branches, 5 with 1–2, 7 with 3–4, 9 with 3–5, 11 with 2–5. V with seta 2 3 to 7-branched, 5 single, 6 with 5–7 branches 9 with 3–5, 10 with 5–7. VI with seta 9 4- to 5-branched. VII with seta 5 bifid or trifid, 7 with 4–8 branches, 9 with 4–6, 11 with 1–4.

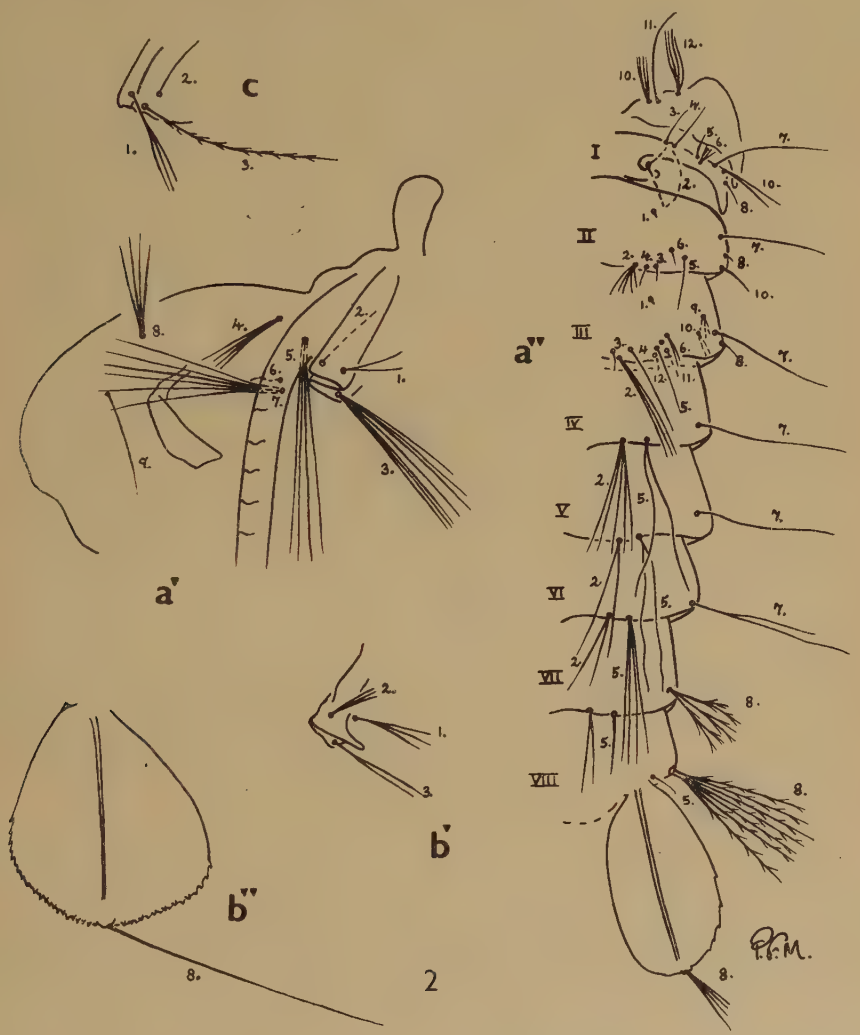


Fig. 2.—Pupa.—a. *Aëdes* (*F.*) *albocinctus*. a′, Cephalothorax; a″, metanotum and abdomen. b. *Aëdes* (*F.*) *gilli*. b′, Anterior setae of cephalothorax; b″, left paddle (dorsal view). c. *Aëdes* (*F.*) ? *simlensis*. Anterior setae of cephalothorax.

According to a manuscript list of material sent by Barraud to the British Museum the pelt marked "*simlensis* ?" should be associated with an adult, and an examination of the pelt shows this to have been a ♀. I am unable to

find this specimen or others of *Aëdes* (*F.*) *elsiae* and *shortti* (Nos. 1119 and 1801 respectively), which are supposed to have been sent in the same tube with it. The collection contains a female from Krol Mt. labelled by Barraud " ? *simlensis* " but without reference number. This specimen has none of the distinctive characters listed by Barraud (1934) for *simlensis* (an examination of the types shows that " *apn* " in this description should read " *ppn* "). It appears to be a typical *gilli* and is obviously not the specimen in question. The label is doubtless an old one attached by Barraud before he decided to describe *gilli* as a distinct species. The adult associated with the pelt labelled " *simlensis* ? " must be presumed to have been lost. The pelt itself differs strongly from those of *gilli*, and resembles those of *albocinctus* in the shape of the paddles and the character of the paddle fringe and seta 8. The character of seta 3 of the cephalothorax is apparently distinctive from either species (fig. 2*c*), but not enough is known concerning the limits of variation in this species and *albocinctus* to be certain of this. Certain pronounced differences in the numbers of branches of the principal abdominal setae may or may not prove to be constant. They are as follows :

Seta 2 with 3–4 branches on segment IV. Seta 5 with 3–4 branches on segment III, 1–2 on IV, single on V and VI. Seta 7 with about 5–6 branches on segment VII. Seta 7 is very small and inconspicuous on segments III–VI. Minor details are as follows : *Cephalothorax* with seta 1 bifid or trifid, 2 single or bifid, 3 single on one side and about $\frac{4}{5}$ the length of the paddle, trifid near the tip on the other and about $\frac{3}{5}$ the length of the paddle, 4 trifid, 5 4-branched, 6 bifid or trifid, 7 bifid, 8 bifid or trifid, 9 single, 10 with about 6 branches, 11 single, 12 trifid. *Abdomen* : Segment I with 3 single or bifid, 4 bifid, 5 with about 2–4 branches, 6 with 5, 7 single, 10 4-branched. II with 2 7- to 9-branched, 3 single, inside 4, 4 bifid, 5 with 2–4 branches, 6 with 4–5, 7 single, 10 single to trifid. III with seta 2 3 to 4-branched, 3 single, 4 single or bifid, 6 with about 3 branches, 7 bifid, 9 and 10 very close together, 9 with about 5 branches, 10 and 11 single. IV with seta 3 single, 4 with about 5 branches, 6 single, 7 bifid, 9 with about 3 branches, 10 single, 11 bifid. V with seta 2 trifid, 3 and 4 single, 6 with about 4 branches, 7 bifid, 9 with about 4 branches, 10 and 11 single. VI with seta 2 bifid, 3 and 4 single, 6 trifid, 7 single, 9 with about 4 branches, 10 and 11 single. VII with setae 2 and 3 single, 4 bifid, 5 single or bifid, 6 bifid, 8 and 9 with 3–4 branches, 10 and 11 single. VIII with 5 single, 8 with 6–8 branches.

Larva.

Material examined.—4 pelts associated with the pupal pelts described above, 1 pelt with associated ♀ adult only and 5 whole larvae, Koti, W. Himalayas ; 1 pelt associated with the pupal pelt described above from tree-hole, Chefang, Yunnan, China, all in the British Museum (Natural History). Material compared included 3 pelts of *A. gilli* associated with the pupal pelts described above and 3 whole larvae from the same locality assigned by Barraud to this species, and the larval pelt associated with the pelt labelled " *simlensis* ? " and described above. The Indian larvae of *albocinctus* and *gilli* were described and figured by Barraud (1934). They are here redescribed more fully, using the nomenclature devised by Marshall (1938), which has been employed by most recent workers on the group.

Aëdes albocinctus (fig. 3*a*).—*Head* : Antenna lightly spiculated, curved, about $\frac{2}{3}$ the length of the fronto-clypeus. Antennal seta (11) at about $\frac{3}{5}$ to $\frac{7}{10}$ the distance from base to apex and with 3–5 branches. Hair 10 and sub-apical hair well developed. Frontal setae (4, 5, 6 and 7) with 9–14, 10–11, 9–14 and 9–11 branches respectively. Seta 5

situated rather far back, 4 well in front of it and 6 slightly further forward still. 4 nearly as large as 6, but rather smaller than 5 and 7, 8 single or double, 9 with 6–9 branches. Clypeal spines of moderate length, tapering gradually to a point, fairly stout. Mentum with 8–11 teeth on either side of the median tooth, the latter not abnormally developed in

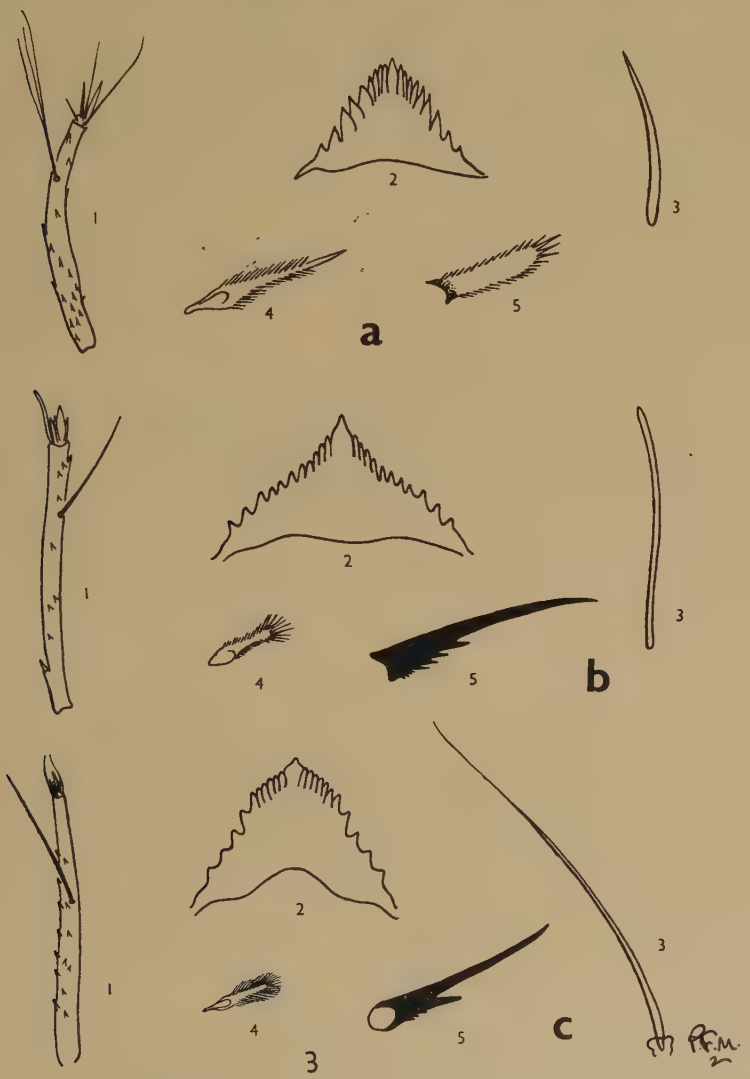


Fig. 3.—Larva.—a. *Aëdes (F.) albocinctus.* b. *Aëdes (F.) gilli.* c. *Aëdes (F.) ? simlensis.* 1, Antenna ; 2, mentum ; 3, clypeal spine ; 4, comb scale ; 5, pecten tooth.

relation to the other teeth. *Thorax* with numerous well-developed stellate setae, metathorax with seta 10 single, 11 well-developed, bifid or trifid, about ½ as long as seta 10 ; seta 9 with about 7 stout branches, 12 stout and extremely long. *Abdomen* with many well-developed stellate setae ; dorso-lateral hair of segment I with 4–5 branches, lateral

hair of I with 3–4, of II with 4–5. Comb a patch of about 35–55 narrow spines, each with a lateral fringe extending nearly to the tip. Siphonal index (uncrushed) about 3·5. Pecten of 18–29 scales reaching nearly to the siphonal tuft, without detached teeth at the distal end and without any teeth beyond the siphonal tuft. The latter situated at about $\frac{1}{2}$ to $\frac{3}{5}$ the distance from base to apex with 7–10 branches which are about $1\frac{1}{2}\times$ the breadth of the siphon at the base. Saddle incomplete, strongly spiculated all over, the spicules increasing somewhat in length from before backwards, but without special development along the posterior border. Saddle hair with 3–5 branches, which are slightly longer than the saddle. Anal "gills" sub-cylindrical, tapering slightly and bluntly pointed at the apex; the upper pair about equal in length to the saddle, lower about $\frac{3}{5}$ this length. Upper (inner) caudal seta with 3–6 branches, lower (outer) single. Ventral brush with 2–3 tufts proximal to the barred area, the tufts in the barred area each with at least 3 branches, usually more.

The Yunnan pelt has only 4 branches in the siphonal tuft and the lateral seta of the 1st abdominal segment bifid. Apart from this it does not appear to differ significantly from the Indian specimens.

Aëdes gilli (fig. 3*b*) differs as follows:

Head with antenna straight, very sparsely spiculated, about $\frac{2}{3}$ the length of the fronto-clypeus. Antennal seta at about $\frac{2}{3}$ to $\frac{3}{4}$ the distance from base to apex, single. Seta 10 and subapical seta somewhat reduced. Frontal setae entirely different in character and arrangement, 4 minute with about 7–10 very delicate branches, 5 and 6 single, more than twice as long as 7, which is single or bifid (Barraud, 1934, says bifid or trifid), 4 slightly posterior to 5. Seta 8 with 2–4 branches, 9 with 3–4. Clypeal spines rather short and slender and of uniform thickness except at the tips, where they are bluntly pointed. Mentum with the central tooth very prominent, lateral teeth numbering 12–14 on either side. *Thorax* without stellate setae. Seta 9 of metathorax with 5–9 branches, 10 bifid or trifid, 11 minute with about 3–5 branches. *Abdomen*: Dorso-lateral seta of segment I with 3–5 branches, lateral seta of I with 3–5, of II with 3–4. Comb a patch of about 70 rather narrow scales with a long apical fringe and a shorter lateral fringe extending for some way down towards the base. Siphonal index (uncrushed) about 4·5. Pecten of 25–28 strongly sclerotized spines, without detached spines and not reaching nearly to the siphonal tuft. Typical spines with two well-developed basal denticles and other smaller ones. Siphonal tuft situated at about $\frac{3}{5}$ to $\frac{2}{3}$ the distance from base to apex and with 6–9 branches about equal in length to the breadth of the siphon at base. Saddle hair with 3–4 branches just over $\frac{1}{2}$ the length of the saddle. Anal "gills" relatively long, tapering, lower pair approximately equal in length to the saddle, upper about twice as long. Upper caudal seta with 5–7 branches. Ventral brush with two tufts proximal to the barred area.

The pelt attributed to *simlensis* (fig. 3*c*) differs from those of *albocinctus* as follows:

Antenna straight. Antennal seta bifid, situated at just beyond $\frac{1}{2}$. Antenna about $\frac{1}{2}$ length of the fronto-clypeus. Frontal seta 4 with 10–11 branches, 5 with 5, 6 missing, 7 with 7, 8 bifid, 9 missing. Seta 4 is only about $\frac{1}{3}$ the length of seta 7 and this in turn is about $\frac{2}{3}$ the length of 5. 4 is anterior to 6. Clypeal spines longer and more slender. Mentum rather different in shape and with the main central tooth better developed, 11 teeth on one side of the central tooth and 12 on the other. Thorax without strongly developed stellate setae. Seta 11 of metathorax small and delicate, bifid. 9, 10 and 12 as in *albocinctus*. Abdomen with lateral and dorsolateral setae of segment I trifid. Lateral seta of II bifid on one side, trifid on the other. Comb scales broader and blunter at the ends, rather as in *Aë. gilli*. Pecten composed of spines similar to those of *gilli*, but with only 1 well developed secondary denticle. Pecten finishing well short of the siphonal tuft, which has 3 branches and is situated at just beyond $\frac{2}{3}$. Siphonal index (uncrushed)

apparently about 4. Saddle hair bifid, about equal in length to the saddle. Anal "gills" large and blunt-ended, upper pair about $2\frac{1}{2}\times$ as long as the saddle, lower pair about $\frac{3}{5}$ the length of the upper. Upper caudal seta bifid. Ventral brush incomplete, but apparently with some reduction of branching; the most distal tuft with only 2 branches.

It will be seen that, whereas the pupa of this species resembles that of *albocinctus*, the larva is more like that of *gilli* except with respect to the frontal setae.

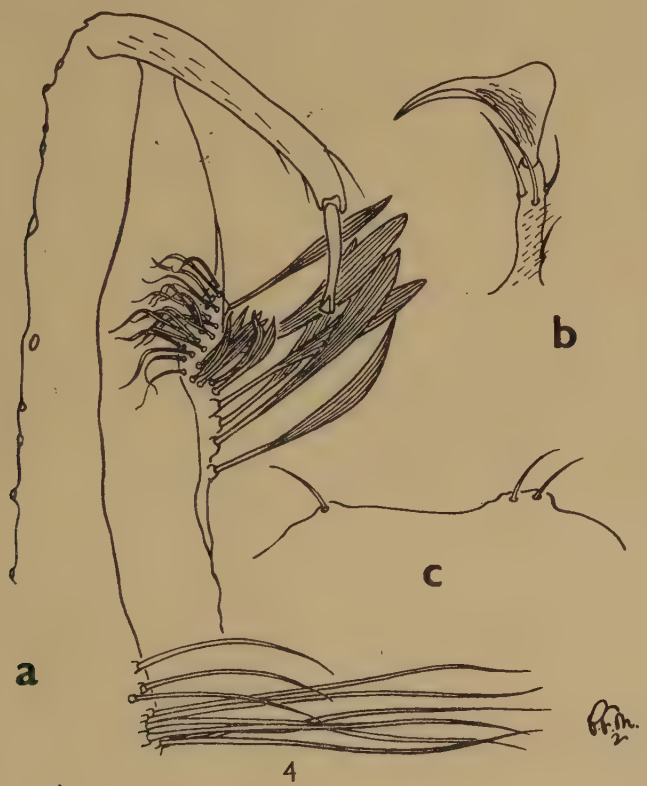


FIG. 4.—Male terminalia. *Aëdes* (*F.*) *albotaeniatus*. a, Coxite and style. b. Claspette. c. IXth tergite.

Aëdes (*F.*) *albotaeniatus* var. *mikiranus* Edwards.

Male terminalia.—All specimens examined by us have been destroyed. One of us (P. F. M.) compared a single specimen with the types of *Aëdes albotaeniatus* (Leicester) and *Aëdes lepchana* Barraud. All three appeared to be virtually identical. The figure given by Barraud (1934) for type form *albotaeniatus* is inadequate, and the terminalia of the type male of this species have therefore been redrawn (fig. 4). The scales on the inner face of the coxite are rather more numerous in *lepchana*, but this character is probably subject to variation.

Pupa.

Material examined.—1 pelt of type form *albotaeniatus* with associated ♀ adult from Ginting Simpab, Malaya, and 1 pelt of var. *mikiranus* with associated larval pelt from Chefang, Yunnan, China, both in the British Museum (Natural History).

Cephalothorax (fig. 5*a*).—Trumpet very long and narrow, slightly infuscated towards apex. Seta 1 short and rather delicate with 4 branches, 2 longer and stouter, single, very lightly plumose, 3 less than half as long as 2, bifid, 4 and 5 similar to 1, 4 and 5-branched respectively, 6 short, single, 7 missing, 8 short with 6–8 branches, 9 rather longer, bifid some distance from the base, 10 and 12 short with about 5 delicate branches, 11 longer, bifid. *Abdomen* (fig. 5*b*): Segment I with seta 2 modified as usual to form a large float-

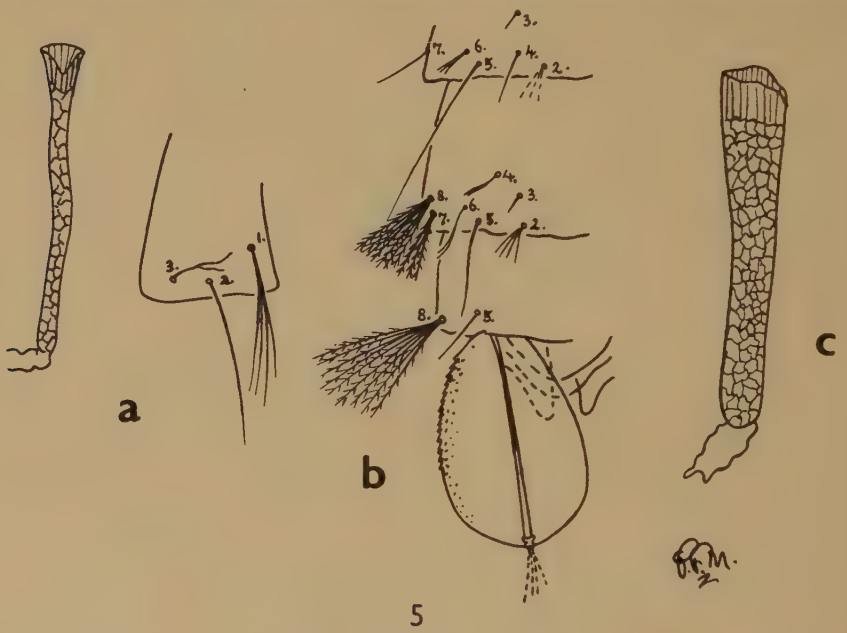


Fig. 5.—Pupae. a–b. *Aëdes* (*F.*) *albotaeniatus*. c. *Aëdes* (*F.*) *albotaeniatus* var. *mikiranus*. a, Trumpet and anterior setae of cephalothorax; b, terminal abdominal segments; c, trumpet.

hair, 3 and 4 single, 5 and 6 each with about 7 branches, 7, 8 and 10 single. Seta 4 about equal in length to seta 2 of the cephalothorax, 7 and 10 rather shorter, others minute. Segment II with seta 4 long, slender, single, nearly as long as the paddle, 7 single, about half this length, 10 rather shorter, other setae small and delicate, 2 with 4 branches, 3 single, 5 bifid, 6 7-branched, 10 bifid. Segment III very much like II. Seta 2 with about 5 branches, 7 apparently single, 9 small and inconspicuous with about 4 branches, 11 bifid. Segment IV with 2 bifid, 4 small and trifid, 5 long and single, resembling 4 on the anterior segments, 7 rather short, bifid, 10 single, otherwise much like III. Segment V with seta 2 small and trifid, 3 outside 2 (as on the preceding segment) and very much anterior to it, 4 single, slightly outside 3 and situated between this and 2, 10 trifid, 11 long and single, other setae much as on IV. VI with seta 2 missing, otherwise as V. VII with 2 4-branched, 6 single and nearer the posterior edge than on other segments, 7 and 8 both showing a similar type of development with short, stout, stiff, plumose branches, 7 with 3 branches,

8 with 7, other setae much as on VI. Segment VIII with seta 5 single, 8 with 9 branches. Paddles pear-shaped, the outer edge thickened on about the apical half and with a narrow band of spicules extending from the base to the posterior edge, these spicules smaller towards the centre of the paddle and progressively larger towards the outer edge. Seta 8 small and 4-branched, arising from a well-developed collar.

The pelt of *mikiranus* differs as follows :

Cephalothorax with trumpets about the same length, but broader (fig. 5*c*). Seta 1 bifid, 2 rather stouter and more obviously plumose, 3 with about 4 branches, 7 long, stout, bifid on one side, split apically into about 5 branches on the other, 8 and 9 bifid and single respectively, 10 bifid, 11 single, 12 bifid on one side, trifid on the other. *Abdomen* : Segment I with seta 6 4-branched, 7 and 8 missing. II with setae 2 and 4 missing, 5 trifid, 6 4-branched, 10 single on one side, bifid on the other, 7 about $\frac{3}{5}$ and 10 about $\frac{4}{5}$ the length of the paddle on one side, about $\frac{2}{5}$ and $\frac{3}{5}$ respectively on the other. III with seta 2 missing, 4 single, nearly as long as the paddle, 5 trifid, 7, 10 and 11 single. IV with 2 bifid, 5 missing, 7, 10 and 11 single. V with seta 2 single, 3 slightly inside 2, 4 well outside, 7 single, 10 trifid, 11 single. VI with 2, 4, 7 and 10 single. VII with 2 and 4 single, 6 bifid, 7 and 8 missing, 10 and 11 single. VIII with seta 8 missing. Paddles with spicules other than those on the extreme edge either absent or very small and inconspicuous. Seta 8 with 5 branches on one side, 4 on the other.

Larva.

Material examined.—A single pelt of *albotaeniatus* var. *mikiranus* from Chefang, Yunnan, associated with the pupal pelt described above.

Barraud (1934) gives the following description of the larva of type form *albotaeniatus*. This description was based on a drawing by Terzi of a pelt from Ginting Simpab, probably associated with the pupal pelt from that locality described above. Both the pelt and the drawing have now been lost :

" *Comb* of about 14 slender, sharp-pointed teeth in a patch ; uppermost and lowermost tufts of VIII remarkably large, each with about 15 branches, median tuft of only about 5 branches. Siphon very long for an *Aëdes*, fully 6 times as long as its diameter at base, tapered on distal $\frac{1}{3}$ only ; pecten of only about 10 almost simple teeth, with one widely detached from the rest ; tuft 4-branched, well beyond the detached pecten tooth ; *osc* 4-branched ; *lh* long and single."

The pelt of *mikiranus* differs from this description as follows :

Comb much distorted but apparently with 9 teeth on one side and 11 on the other. On the side with 11 teeth there are in addition 2 atypical supernumary teeth (fig. 6*a'*). The typical teeth have a lateral fringe of small but quite distinct secondary denticles on about the basal half (fig. 6*a*). Setae of segment VIII not exceptionally large. Siphon distinctly swollen at about half way, tapering sharply beyond this point (fig. 6*c*). Siphonal index (crushed) about 3. Pecten of 25 teeth on either side, these teeth forming, in some places, a double row. Typical teeth with several very small basal denticles (fig. 6*b*). Distal 3–4 teeth larger than the remainder and somewhat more widely spaced. Basal teeth smaller than the average. Siphonal tuft with 5 very stout, stiff branches. Lower (outer) caudal seta with two branches, one of which is bifid for about the distal $\frac{2}{3}$. Upper (inner) single. A curious feature of the saddle not mentioned by Barraud in his description of the type form is the presence, on either side of the point of origin of the caudal setae, of a pair of stout spines, each with a basal fringe of secondary denticles, resembling in appearance the comb spines (fig. 6*d*). Other details are as follows :

Head.—Antenna (fig. 6*e*) short, slightly curved, smooth, expanded at the base. Antennal seta situated at about 0·45 × the distance from the base, simple on one side and with one small branch on the other. Hair 10 and sub-apical hair rather short, spine-like. The head is very much crushed and distorted and the positions of the frontal setae are difficult

to determine. The following interpretation is provisional: Setae 5 6 and 7 situated rather near the front margin of the head and successively posterior to one another, bifid. 4 not seen. 8 missing, 9 bifid. Clypeal spines (fig. 6*f*) slender, curved. Mentum much as in *gilli*, with 9 teeth on one side of the central tooth and 10 on the other.

Thorax covered with very conspicuous stellate setae. Metathorax much as in *albocinctus*, but seta 9 with only 4 branches on one side, apparently trifid on the other. Seta 11 abour $\frac{1}{4}$ the length of 10.

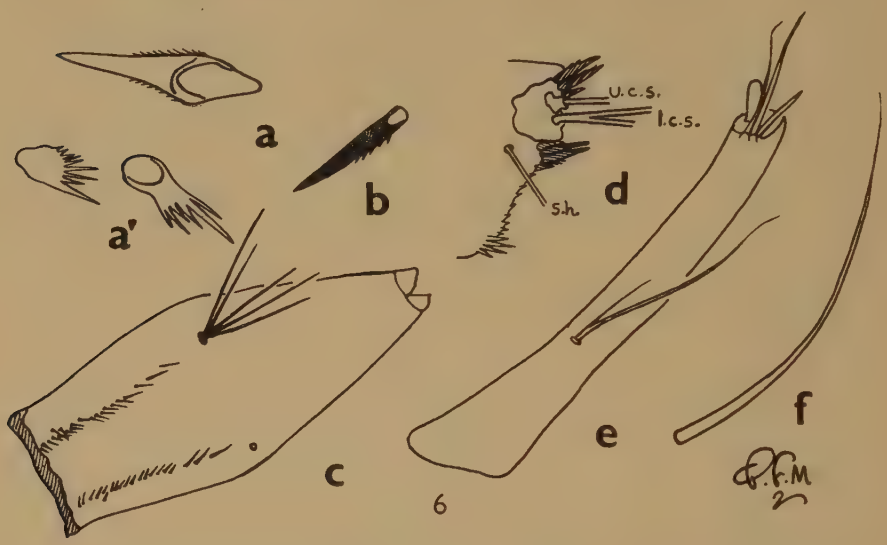


FIG. 6.—Larva. *Aëdes* (*F.*) *albotaeniatus* var. *mikiranus*. a. Typical comb spine; a′, Atypical comb spines; b, typical pecten tooth; c, siphon; d, edge of saddle; e, antenna; f, clypeal spine. u.c.s., Upper caudal seta; l.c.s., lower caudal seta; s.h., saddle hair.

Abdomen with numerous strongly developed stellate setae. Lateral setae of segments I–VI bifid. Saddle hair single, about twice as long as the saddle. The latter incomplete ventrally and with spicules restricted to the distal edge. Ventral brush almost entirely missing but apparently with only a single very small unpaired tuft outside the barred area. Anal "gills" entirely missing.

REFERENCES.

BARRAUD, P. J., 1924, Four new mosquitoes from the Western Himalayas. *Indian J. med. Res.* **11**: 999–1006.

——, 1934, *Fauna of British India: Culicini.* London.

CHOW, C. Y., 1949, Culicine mosquitoes collected in Western Yunnan. *Proc. ent. Soc. Wash.* **51**: 127–132.

KNIGHT, K. L., 1948, The *Aëdes* (*Finlaya*) *albotaeniatus* group of mosquitoes (Diptera, Culicidae). *Proc. ent. Soc. Wash.* **50**: 1–8.

——, and CHAMBERLAIN, R. W., 1948, A new nomenclature for the chaetotaxy of the mosquitoe pupa based on the comparative study of the genera (Diptera, Culicidae). *Proc. Helminth. Soc. Wash.* **15**: 1–10.

——, and MARKS, E. N. An annotated checklist of the subgenus *Finlaya*. (In the press.).

MARSHALL, J. F., 1938, *The British Mosquitoes.* London: Brit. Mus. (Nat. Hist.).

NOTES ON SOME NEW OR RARE RHOPALOCERA FROM EASTERN AFRICA.

By T. H. E. Jackson, F.R.E.S.

Part I.

The West Elgon Area of Uganda.

The Rhopalocera found in the West Elgon area of Uganda, centred round the Mbale District of Bugishu, are of peculiar faunistic interest. The area is confined to the forests along the 5000–5500 ft. level of N.W. Mt. Elgon. It is warmer, more humid and considerably lower in altitude than the corresponding forests on East Elgon and has a much higher rainfall.

The Rhopalocerous fauna contains certain species common to East Elgon, e.g., *Bematistes poggei* Dewitz, *Acraea johnstoni* Godman, *Acraea disjuncta* Grose-Smith, *Acraea ansorgei* Grose-Smith, *Belenois victoria* Dixey, etc., but it also shows a very strong typical West African influence, as exemplified by such species as *Pseudacraea gottbergi* Dewitz, and *Pseudacraea dolomena* Hewitson, *Cymothoe lurida butleri* Grünberg, *Euryphene sophus audeoudi* Riley, *Acraea rogersi* Hewitson, *Acraea alciopoides* Joicey and Talbot, *Telipna consanguinea* Rebel, *Liptena undina* Grose-Smith and Kirby, *Micropentila brunnea* Kirby, etc., which are all typically western species not found on the east of the mountain.

In addition to these there are various sub-species which appear to be endemic such as : *Pseudacraea deludens echerioides* Talbot, *Bematistes elgonense elgonense* Poulton, *Mylothris rhodope somereni* Talbot[1], and the new subspecies of *Pseudacraea dolomena* Hewitson described below. These have not been found elsewhere.

Knowledge of the occurrence of some of the latter long ago pointed to the special interest of the area, and this was increased by odd captures received from time to time by Dr. V. G. L. van Someren or myself, but it was not until the arrival of J. A. Burgess, of the Uganda Administration, at Mbale, that the area was systematically collected, and he is much to be congratulated on his great discoveries.

It was natural to speculate as to the possible reason for the presence of this very strange fauna. It seemed essential to prove that the area was at one time isolated from the rest of Uganda and the West African forest region, and in this connection I wrote to Dr. L. S. B. Leakey, of Nairobi. He has kindly allowed me to publish his reply, which is as follows :

" I think the most likely explanation is not isolation of the mountain when the lake was up to the foot, but rather isolation of the mountain during the very dry period when Lake Victoria dried up and when most of the country was almost desert.

" This major dry period resulted in the extinction of almost the whole of the fish fauna of Lake Victoria of that period, and the present-day fish fauna is entirely different except for one or two mud fishes which possibly survived in a swamp in the middle of the area.

[1] Since writing this paper it appears almost certain that this insect is a subspecies of *Mylothris sjoestedti* Aurivillius. It is hoped to include this in a later paper, after consultation with Mr. G. Talbot. The diagnosis, if correct, would provide additional evidence of western affinity.

" The same dry period resulted in the extinction of some 60 or 70 mammalian species that we know of, and probably many more yet to be proved, and it was only on the high mountains like Mt. Kenya, Mt. Kilmanjaro, and Mt. Elgon that there was enough moisture for animal life. We know that man at that time took to the mountains like Kenya, etc., which he could only have done if animals were there and some water.

" This very dry period was after the Middle of the Pleistocene perhaps 400,000 years ago, and it lasted for a considerable time. I think it was quite a long enough period for subspecies to come into existence : in the same way that the Congo River fish when they moved into L. Victoria after the dry period suddenly branched out into new species and subspecies under the changed conditions of environment.

" I think it is far more likely that isolation by intervening desert was the cause of the conditions you refer to, rather than isolation by water, which would inevitably have islands scattered about as well as floating masses of vegetation, as we have in L. Victoria to-day, which allow for considerable fauna movement."

And in a later letter in reply to a further query :

" I should say that the major dry period was *after* the time when the forest stretched right across, although there was a further spread of forest, but probably not to such a great extent, subsequently."

It seems then that the most plausible explanation covering the known facts is as follows :

(*a*) The West Elgon area was originally part of the Great African Forest. Hence the presence of so many W. African species.

(*b*) Thereafter, during the Great Drought, the area was isolated from Western Africa. This lasted long enough for the formation of new subspecies among the W. African population.

(*c*) The rest of Uganda was depopulated during the dry period with the exception of W. Elgon, and possibly also of a small area in the extreme west centred around Ruwenzori. It was subsequently repopulated from the west during the second period of afforestation mentioned by Dr. Leakey, which would account for the presence of the many W. African forms in Uganda to-day. It should be noted that these have again diverged in many cases from the typical W. African forms, and this may be analogous to Dr. Leakey's comment on the fishes of Lake Victoria.

(*d*) The West Elgon area was subsequently invaded by the semi-montane species of East Elgon, and this process is probably still going on.

There is at present no serious barrier to invasion either from E. Elgon or from the rest of Uganda *via* the riverine gallery forest, although the present wholesale clearing in the Eastern Province of Uganda will make this progressively more difficult.

Descriptions of the new sub-species all discovered by Mr. J. A. Burgess of the Uganda Administration are given below, together with a few notes.

References subsequent to the publication of Aurivillius' *Rhopalocera Aethiopica* are given in a list at the end of this paper. The terms " geographical race " and " sub-species " are considered synonymous in this paper (*vide* Mayr, 1942). Mr. Bennett has kindly dissected the genitalia, where necessary, and I quote his remarks in each case.

NYMPHALIDAE.

Pseudacraea gottbergi Dewitz.

Pseudacraea gottbergi **burgessi** subsp. n.

♂. *Ups. fw.*: Sepia, darker than in *g. gottbergi* Dewitz or *g. neumanni* Thurau. A dark orange median band as follows covers the apex of the cell, 3 mm. wide, but does not reach the costa; a minute dot in the base of area 5, thence through the base of areas 4 and 3, still 3–4 mm. wide and almost straight distally; a large elongate spot in 2 starting just beyond the origin of vein 2 and running vertically across the cellule at its proximal edge; this completely fills the cellule up to ½ mm. of the margin and is bifurcate distally; streak-like spots in 1*a* and 1*b* reaching the inner margin, but shifted inwards towards the base, their distal and proximal edges sagitate.

Ups. hw.: Sepia with a transverse orange band from midway along the costal margin to the inner margin. This band is paler than that of the fw. and gradually becomes broader as it crosses the wing, being 2 mm. wide at the costa and 5 mm. on vein 1*b*. Covers the apical half of the cell. The basal triangle is narrower than in the other subspp. and very dark black where it crosses the cell, becoming paler towards the costa. Veins on both wings, distally of the orange bands, heavily blackened and black streaks in the interneural folds.

♀. Similar to the ♂, but bands on both wings broader, that of the fw. covering the base of cellule 5 and the lower edge of cellule 6. Fw. more elongate.

♂♀. *Uns.*: Similar to *g. neumanni* Thurau, but both bands narrower. Fw. as above but spots in spaces 1*a* and 1*b* proximally white. Hw. band white, sometimes dusted with orange scales. Basal triangle red with black spots arranged as in the other two subspecies.

The series before me, 32 males and 12 females, show a few minor variations and one well-defined form.

(*a*) Seven males and 1 female are of the form *albifascia* (see below); in two of these, both males, the fw. band is paler orange, but not so pale as in *g. neumanni* Thurau.

(*b*) In 10 males and 3 females the hw. is intermediate between form *albi-fascia* and typical *burgessi*. The white colour invades the orange band from the costa to vein 6 and from the inner margin to the cell, but is mixed with orange scales.

(*c*) The orange spot in space 3 of the fw. may be cut off short distally or continued as a streak along vein 2 to within 1 mm. of the margin. These variations appear in roughly equal numbers, and the latter is present in the ♀ allotype.

(*d*) One specimen, a male, shows an approach to *g. gottbergi* Dewitz in that the orange band of the hw. above is extended distally in orange interneural streaks. Several other specimens show traces of this.

Pseudacraea gottbergi burgessi form **albifascia** forma n.

Differs from typical *burgessi* in that the hw. band above is pure white. The form occurs in both sexes. The underside is as in *burgessi*.

Expanse: Length of fw., ♂, 34 mm.; ♀, 36 mm.

This very distinct subspecies can be distinguished at once from either of the others by its constantly smaller size. Comparative figures are: *g. gottbergi*, ♂, 38 mm.; ♀, 40 mm.; *g. neumanni*, ♂, 36 mm., ♀, 40 mm. Considering that West Elgon is a very wet area this is a remarkable and totally unexplained development.

It can be distinguished from *g. gottbergi* by the well-defined hw. band and differently shaped fw. band, whilst form *albifascia* is distinguished from *g. neumanni* by the much narrower and darker orange fw. band.

Mimetic association.—The form *burgessi* is undoubtedly influenced by *Bematistes quadricolor latifasciata* (Sharpe), hence the reduction of the fw. band and darker colouring, while f. *albifascia* is an excellent mimic of *B. elgonense* Poulton.

Habitat.—Uganda; West Elgon, Mbale District of Bugishu; Kalinzu Forest, W. Ankole.

♂ Holotype, ♀ allotype and holotype form *albifascia*, N.E. Uganda, Namatala River, nr. Mbale, W. Elgon, 5000 ft., 1–20 Jan., 1950, 1–12 Dec., 1949, 20–30 Jan., 1950 (*J. A. Burgess*). All in the British Museum. Paratypes in B.M., Oxford University Museum, Coryndon Museum, Nairobi, and in collections Burgess, van Someren and Jackson, all from the same locality.

One ♂, Kalinzu Forest, West Ankole, Uganda, Oct., 1948 (*T. H. E. Jackson*), coll. Jackson.

The occurrence of *g. burgessi* in the extreme west of Uganda as well as in West Elgon would seem to indicate that it is a more ancestral form than *g. neumanni* of the rest of Uganda to-day. It may well be that some of the Uganda Rhopalocera had already diverged from their western prototypes before the Great Drought. It is significant, with reference to the possible survival of *burgessi* in the extreme west of Uganda, that this is one of the wettest areas in eastern Africa to-day, and might, therefore, have been able to support a relict fauna during the Drought. This presupposes that the area was relatively wetter at that time.

Systematic List.

Pseudacraea gottbergi Dewitz, 1884.

The known races of *gottbergi* Dewitz are now as follows:

A. *Pseudacraea gottbergi gottbergi* Dewitz, 1884.

(= *Pseudacraea gazengeli* Oberthür, 1893).

(i) ♂ and ♀ f. *kuenowi* Dewitz, 1879.

(ii) ♂ and ♀ f. *ochreofasciata* Schultze, 1920.

West Africa to E. Congo.

B. *Pseudacraea gottbergi neumanni* Thurau, 1903.

(= *Pseudacraea kuenowi hypoxantha* Jordan, 1911).

Uganda (except W. Ankole), to S. Sudan.

C. *Pseudacraea gottbergi burgessi* subsp. n.

(i) ♂ and ♀ f. *albifascia* nov.

W. Uganda (Kalinzu Forest, W. Ankole) and West Elgon.

Note.—Eltringham (1910) in his *Mimetic Butterflies*, figures *g. neumanni* Thurau under the name *künowi* Dewitz.

Pseudacraea dolomena Hewitson, 1865.

Pseudacraea dolomena **elgonensis** subsp. n.

Nearest to var. *dolabella* Hall, from which it differs as follows :

♂. *Ups. fw.* : Ground-colour darker, sepia black, but with similar lighter streaks between the veins. Red inner-marginal patch much darker, reddish mahogany. Sub-apical band pure white.

Ups. hw. : Discal band pure white as in *dolabella*.

♀. *Ups. fw.* : Differs from *dolabella* in that the sub-apical bar is pale yellow. The inner-marginal red patch is darker as in the ♂, but is orange-yellow distally in spaces 1*a* and 1*b*.

Uns. : As above in both sexes.

Of the 24 males before me 6 show a tendency to orange in the fw. apical bar in cellule 3, while 8 have more or less pronounced orange spots extending beyond the hw. band towards the costa in cellules 6 and 7. This latter variation occurs commonly in *dolabella*.

Expanse : As in *dolabella*.

Mimetic association.—This very distinct subspecies is influenced by *Bematistes quadricolor latifasciata* Sharpe, especially in the ♀. The orange-yellow distal area of the inner-marginal patch greatly increases the resemblance. There is one specimen, a male, of this subspecies in Dr. V. G. L. van Someren's collection, Nairobi, taken many years ago in the same area by a native collector.

Habitat.—UGANDA ; West Elgon, Mbale District of Bugishu.

♂ Holotype, ♀ allotype, Dec. 1949–Jan. 1950, both in B.M. Paratypes in B.M. ; University Museum, Oxford ; in Collections Burgess, van Someren and Jackson and in the Coryndon Museum, Nairobi, all from the same locality.

Neptis metella Doubleday and Hewitson, 1850.

Neptis metella subsp. **flavimacula** subsp. n.

♂ and ♀. UPS. : Differs from *metella metella* Doubleday and Hewitson, as follows :

The two small spots on the inner margin of the fw. in 1*a* and 1*b* are yellowish-brown ; the remaining spots of the fw. and the hw. band are fringed with yellow scales. The white cell streak of the fw. is reduced to a streak along the median vein, and in some cases (3 out of 26 before me) is almost obsolete. The extreme tip of this streak is severed, although not always entirely so, by a thin single or sometimes double black line, thus forming a separate spot.

♂ and ♀. *Uns. fw.* : Sub-apical spots broad and almost quadrate. In the typical form they are streaks divided by the ground-colour. The costal sub-apical streak is vestigial and that in 4 absent. Cell streak reduced as above. *hw.* : As in the typical form.

Mimetic associations.—This race may be influenced by *Neptis woodwardi* Sharpe, which is very common in the area. A few specimens from Kakamega, in the Kavirondo Province of Kenya, are intermediate between *metella metella* Doubleday and Hewitson and *flavimacula* according to Dr. V. G. L. van Someren.

Genitalia.—In *flavimacula* the apex of the valve is more bluntly rounded. The dorsal section of the vinculum is more massive. The two insects are obviously closely allied.

Habitat.—UGANDA : West Elgon, Mbale District of Bugishu.

♂ Holotype : Mbale, Uganda, Jan., 1950 (*T. H. E. Jackson*).

♀ Allotype : Uganda, Namatala River, nr. Mbale, E. Province, 5000 ft., Feb., 1948 (*J. A. Burgess*).

Both in British Museum. Paratypes in B.M. ; University Museum Oxford ; Coryndon Museum, Nairobi ; and in collections Burgess, van Someren and Jackson, all from the same locality.

One ♂, Kakamega, Kenya (*T. H. E. Jackson*) in collection Jackson, Kitale, Kenya, and others in coll. van Someren.

ACRAEIDAE.

Bematistes elgonense elgonense Poulton, 1927.

This species occurs in the West Elgon area, flying with *B. poggei nelsoni* Grose-Smith and apparently without intermediates. It is sexually dimorphic, whereas in *poggei nelsoni* the sexes are alike, and moreover the size and general facies are entirely different. It should, therefore, be considered a distinct species, and not a subspecies of *poggei* as stated by Le Doux, 1937.

There are now, therefore, two known races of this species : *Bematistes elgonense elgonense* Poulton, 1927, West Elgon, and *Bematistes elgonense toroense* Poulton, 1929, West Uganda, from Toro to Katera.

Acraea disjuncta disjuncta Grose-Smith, 1898

Acraea disjuncta alciopoides Joicey and Talbot, 1921.

As above, these forms fly together in the West Elgon area. A long series of each, before me, show no intermediates and the external facies is very different. *A. disjuncta* is an East African highland form, whereas *alciopoides* is a low country forest insect of western affinities. There is no doubt that they should be regarded as separate species and not as forms of *disjuncta*, as stated by Joicey and Talbot, 1921. Type *alciopoides* from Ituri Forest.

Genitalia.—Easily separable ; uncus has a sinuate dorsal contour in *alciopoides*, straight in *disjuncta*. Valve much narrower in *alciopoides*.

Acraea penelope Staudinger, 1896.

Acraea penelope penelope Staudinger, female f. **josetta** forma n.

Nearest to ♀ f. *penella* Eltringham, from Entebbe, Uganda, from which it differs as follows :

Ups. fw. : Sub-apical band narrower and more sharply defined as in the male. The yellow-brown discal area is extended to within 1 mm. of the hind margin in areas 1*a*–2 incl., as against 2 mm. in *penella*.

Ups. hw. : The black marginal border is narrow and dyslegnic, especially posteriorly, where it is reduced to interneural streaks and spots at the ends of the veins.

Uns. fw. as above. *Uns. hw.* as in *penella*.

Named after Mrs. J. A. Burgess.

Habitat.—UGANDA : West Elgon, Mbale District of Bugishu.

Type ♀, Mbale, Uganda, Jan., 1950 (*T. H. E. Jackson*) in B.M. Others in collection Burgess, Uganda.

(Part II to follow.)

PUBLICATIONS

The principal Publications of the Royal Entomological Society are *Transactions* and *Proceedings*.

The **Transactions** form an annual volume, each paper in the volume being issued as a separate part. The parts are issued irregularly throughout the year.

The **Proceedings** are issued in three series:

Series A. General Entomology

Series B. Taxonomy

Series C. Journal of Meetings

Series A and B are issued in twelve parts, forming an annual volume of approximately 240 pages each.

The following information is supplied for the guidance of authors wishing to submit papers for publication in any of the Society's journals.

TRANSACTIONS

Papers offered for publication in the *Transactions* are considered by the Publication Committee of the Society, which meets usually in the months of May and November. In order that papers may be considered at these meetings it is necessary for the manuscript and drawings for illustrations to be in the hands of the Registrar fourteen days before the meeting of the Committee.

The Society is prepared to undertake the provision of a reasonable number of figures, in line or half-tone. Colour work is accepted only by special arrangement.

Papers of less than eight printed pages (approximately 7,000 words) will not normally be accepted for the *Transactions*, and papers by authors who are not Fellows of the Society must be communicated by a Fellow.

PROCEEDINGS SERIES A AND SERIES B

Papers submitted for publication in either *Series A* or *Series B* of the *Proceedings* are considered by the Editor and may be submitted at any time. Papers by authors who are not Fellows of the Society may be accepted if they are communicated by a Fellow.

Line blocks will be provided by the Society. Half-tone and colour work are accepted only by special arrangement, and the author may be required to pay for the blocks.

PROCEEDINGS SERIES C

Series C is issued before every General Meeting. It contains abstracts of communications to be made, together with the titles of papers accepted for publication in the *Transactions*.

The annual subscription to *Series A. General Entomology* is £2 0*s*. 0*d*.; *Series B. Taxonomy*, £2 0*s*. 0*d*. (single parts 4*s*. 0*d*.); and *Series C. Journals of Meetings*, 6*s*. 0*d*.

As from January, 1936, the journal *Stylops* is continued as *Proceedings Series B. Taxonomy*. Copies of volumes 1–4 are available at £1 16*s*. 0*d*. each, post free.

GENERAL

The original drawings for all figures must be supplied by authors and must be drawn to a scale which will permit of their reduction, singly or after grouping, to an area of dimensions not exceeding 7 by 4½ in.

A uniform method is adopted for the citation of bibliographical references in the Society's publications as follows:

Smith, A., 1936, New Species of COCCIDAE. *Proc. R. ent. Soc. Lond.* (B) **6**: 301–306, pl. 1.

——, 1936, New species of COCCIDAE. *Trans. R. ent. Soc. Lond.* **84** : 901–936.

Titles of periodicals cited are to be abbreviated in the manner indicated in the *World List of Scientific Periodicals*, 2*nd edition*, 1934.

Authors are entitled to receive 25 copies of their papers free of charge and may purchase additional copies provided that request be made before publication.

Papers offered for publication should be sent to the Registrar, Royal Entomological Society of London, at 41, *Queen's Gate, London, S.W.* 7, and must be typewritten on one side of the paper only, with double spacing. **All papers must be provided with a summary.**

The copyright of the Society's publications is vested in the Society.

MEETINGS

TO BE HELD IN THE SOCIETY'S ROOMS

41, Queen's Gate, S.W. 7

1951

Wednesday, August 15
„ October 3
„ November 7
„ December 5

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

The Fellowship and Fees

Fellows pay an Admission Fee of £2 2*s*. The Annual Contribution, £3 3*s*., is due on the first day of January in each year, and is payable in advance. Fellows under the age of 25 years may pay the entrance fee in two equal annual instalments.

Fees should be paid to the Hon. Treasurer, at 41, Queen's Gate, S.W.7, and *not to the Hon. Secretary*.

Fellows desiring to pay their Annual Contribution through their bankers may obtain an official form of banker's order by applying to the Hon. Treasurer.

Fellows whose Contributions for the current year have been paid are entitled to receive the *Transactions* and *Proceedings* of the Society free of charge. Further copies may be purchased at reduced prices by applying to the Hon. Secretary.

Forms of application for Fellowship, copies of the Bye-Laws and the List of Fellows may be obtained from the Hon. Secretary.

Meetings and Exhibitions

Fellows and others wishing to make a communication to a General Meeting of the Society are requested to send in their names, the title of their exhibit, and a short abstract of their remarks, to the Hon. Secretary fourteen days before the meeting at which it is proposed to make the communication. Should it be desirable to publish a fuller account of the communication the manuscript may be submitted for publication in *Proceedings Series A* or *Series B*. If the epidiascope is required, 24 hours' notice must be given. Objects for projection should not exceed 6 in. by 6 in.

Fellows resident abroad, or otherwise unable to attend meetings, are reminded that notes or observations sent to the Hon. Secretary may be communicated to a General Meeting on their behalf.

PRINTED FOR THE SOCIETY BY ADLARD AND SON, LTD., BARTHOLOMEW PRESS, DORKING.